MM2/Mini4 10/100 Ethernet Daughterboard (P/N 201750-xxx)

User's Manual And Troubleshooting Guide

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Revision B

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MANUAL REVISION HISTORY

REVISION NUMBER	DATE	BY	REASON FOR REVISION
A	5/2/07	GSG	ORIGINAL
B	2/24/09	IB	Updated contact information to reflect Moog Components Group

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1 MM2/Mini4 10/100 Ethernet Daughterboard, P/N: 201750-xxx

The Prizm MM2/Mini4 10/100 Ethernet daughterboard combines the functionality of a four-port 10/100 Ethernet switch and a high speed synchronous Ethernet to serial bridge to provide an end-to-end Ethernet link over a fiber multiplexer. This board must be stacked onto a MM2 or a Mini4 motherboard set.

The board contains no user-modifiable jumper selections for this board. All functions are handled automatically.

1.1 10/100 Ethernet Interface:

The 10/100 Ethernet daughterboard automatically supports both 10 and 100Mbps Ethernet on each of the 4 switch ports. Mixed port-to-port Ethernet rates are supported and rate adaptation is handled automatically. The 5th port on the switch connects to the synchronous Ethernet to serial bridge chip. This chip buffers the Ethernet packets and flows the packets serially through the MM2/Mini4 daughterboard connector at a synchronous data rated defined by the MM2 (16Mbps) or Mini4 (25Mbps).

The 100Mbps Ethernet data rate is approximately 4 times the daughterboard throughput capacity of the MM2 and Mini4. Therefore there will be some degradation to the Ethernet traffic throughput over the MM2 or Mini4. At the 10Mbps Ethernet rate there should be little throughput degradation.

Testing by Prizm has determined the following end-to-end throughput rates:

MM2 or Mini4	Ethernet Rate	Throughput
MM2	10Mbps	8Mbps
MM2	100Mbps	15Mbps
Mini4	10Mbps	20Mbps
Mini4	100Mbps	25Mbps

Ethernet throughput is typically defined as the number of bits in a ping packet divided by the round-trip time that a ping packet takes to get from the originating PC to the target PC and back again. As this is a round-trip measurement, the ping packet bit size is doubled for this computation.

For example from table above:

1. Size of ping packet = 15766 bytes * 8 = 126,128 bits per packet
2. Round-trip time = 17.05 milliseconds

Throughput = Size of ping packet * 2 / Round-trip time
= (126,128 * 2) / 0.01705
= 14,795,073 bps
= 14.79Mbps

1.2 MM2/Mini4 10/100 Ethernet Daughterboard Revision History:

The MM2/Mini4 10/100 Ethernet daughterboard has gone through the following printed circuit board (PCB) and Assembly revisions:

PCB Revision A	Original design.
PCB Revision B	Various circuit and routing corrections.

1.3 MM2/Mini4 10/100 Ethernet Daughterboard Dash (-) Number Definitions

The MM2/Mini4 10/100 Ethernet daughterboard has a Dash Number appended to the part number. This Dash Number identifies the specific board configurations:

-001A // -001A PT	Original configuration, obsolete
-001B // -001A PT	Rev B PCB, no LED display header placed
-002B	Rev B PCB, LED display header placed for Surface

1.4 MM2/Mini4 10/100 Ethernet Daughterboard Operation:

Each of the four 10/100 Ethernet ports automatically switch to follow the PC attached to the specific port. There are two LEDs located within the quad RJ-45 connector. The left LED (green) will be lit if the port is running at 100Mbps and will be off if 10Mbps. The right LED (yellow) will be lit solidly if an Ethernet link is detected and blink off with traffic. All four ports are also auto-polarity correcting so either straight or crossover cables can be used.

NOTE 1: Two DIP-socketed EEPROMs (at U15/20 and U12/13) must be placed for this board to function correctly.

1.5 10/100 Ethernet Interface Daughterboard Indicators and Controls:

LEDS:

There are 13 surface mount vertical LED indicators on the top of the board and 1 surface mount LED indicators on the bottom of the board.

Top of Board

LED	Indication
D1 (Green)	Labeled 'DB PWR', Located at the upper left of the board serves as an indicator that +5VDC is available to the board. Supply voltage to the board is selected via the placement of fuse F6 from the Daughterboard Header (J1), F7 from the Diagnostics Header (J2), or F3 from the Auxiliary daughterboard header (J4).
D2 (Green)	Labeled 'TX DATA', located at the center right edge of the board serves as an indicator the diagnostics data is being transmitted out of the board on the Diagnostics Header (J4) or Diagnostics connector (J6). **NOTE: DIAGNOSTICS NOT AVAILABLE**
D3 (Green)	Labeled 'RX DATA', located at the center right edge of the board serves as an indicator the diagnostics data is being received into the board on the Diagnostics Header (J4) or

	Diagnostics connector (J6). **NOTE: DIAGNOSTICS NOT AVAILABLE**
D4 (Green)	Located at the lower right edge of the board serves as an indicator that the microprocessor is receiving diagnostics requests from the diagnostics PC through the Diagnostics Header (J4) or Diagnostics connector (J6). This LED will blink ON with a received request then OFF with the next request. **NOTE: DIAGNOSTICS NOT AVAILABLE**
D5 (Green)	Labeled 'Q_OF', located on the center top edge of the board, if "OFF" provides an indication that the Ethernet to serial chip U8 is overflowing its internal buffer. Typically this LED will always be "ON" – not in an error state.
D6 (Green)	Labeled 'LOCAL', located on the center top edge of the board, if "ON" provides an indication that the programmable logic device U1 is receiving a system receive clock and receiving data from the Daughterboard Header (J2).
D7 (Green)	Labeled 'REMOTE', located on the center top edge of the board, if "ON" provides an indication that the programmable logic device U1 is receiving a system transmit clock and outputting data onto the Daughterboard Header (J2).
D9 (Green)	Labeled '+3.3V', located at the bottom right edge of the board serves as an indicator that the on-board +3.3VDC power supply (U6) is working.
D10 (Green)	Labeled 'W_TX', located on the center top edge of the board, if "ON" provides an indication that the programmable logic device U1 is receiving data from the Ethernet to serial chip (U8) and outputting data onto the Daughterboard Header (J2).
D11 (Green)	Labeled 'W_RX', located on the center top edge of the board, if "ON" provides an indication that the programmable logic device U1 is receiving data from the Daughterboard Header (J2) and sending it to the Ethernet to serial chip (U8).
D12 (Green)	Labeled "P5 LED1", located at the lower right edge of the board serves as an indicator that data is being sent between the Ethernet Switch chip (U4) and the Ethernet to serial chip (U8). **NOTE: THIS FUNCTION IS NOT AVAILABLE**
D13 (Green)	Labeled "P5 LED2", located at the lower right edge of the board serves as an indicator that data is being sent between the Ethernet Switch chip (U4) and the Ethernet to serial chip (U8). **NOTE: THIS FUNCTION IS NOT AVAILABLE**
D14 (Green)	Labeled "P5 LED3", located at the lower right edge of the board serves as an indicator that data is being sent between the Ethernet Switch chip (U4) and the Ethernet to serial chip (U8). **NOTE: THIS FUNCTION IS NOT AVAILABLE**

Bottom of Board

LED	**Indication**
D8 (Green)	Located at the bottom left edge of the board serves as an indicator that the LED display header is powered.

CONNECTORS AND HEADERS:

J1	ISP Header

+3.3V	1	o	o	2	TMS
TCK	3	o	o	4	TDI
N/C	5	o	o	6	TDO
GND	7	o	o	8	

NOTE: J1 to be used only by PRIZM.

J2	Daughterboard Header				
VDC Supply	1	o	o	2	VDC Supply
RXD_DB	3	o	o	4	TXD_DB
GND	5	o	o	6	GND
RXC_DB	7	o	o	8	TXC_DB
RCV LINK	9	o	o	10	Future
RXD_DB2	11	o	o	12	TXD_DB2

J3	Led Status Connector				
GND	1	o	o	2	PTC FUSE with +5VDC
LOCAL_LED	3	o	o	4	REMOTE_LED
WAN_RX_LED	5	o	o	6	WAN_TX_LED
ACT_P1_LED	7	o	o	8	SPEED_P1_LED
ACT_P2_LED	9	o	o	10	SPEED_P2_LED
ACT_P3_LED	11	o	o	12	SPEED_P3_LED
ACT_P4_LED	13	o	o	14	SPEED_P4_LED
NO_CONNECT	15	o	o	16	NO_CONNECT
NO_CONNECT	17	o	o	18	NO_CONNECT
NO_CONNECT	19	o	o	20	NO_CONNECT
NO_CONNECT	21	o	o	22	NO_CONNECT
NO_CONNECT	23	o	o	24	NO CONNECT
NO_CONNECT	25	o	o	26	NO CONNECT
NO_CONNECT	27	o	o	28	NO CONNECT
NO_CONNECT	29	o	o	30	NO CONNECT
NO_CONNECT	31	o	o	32	NO CONNECT
NO_CONNECT	33	o	o	34	NO CONNECT

NOTE 1: J3 header is located at the top center side of the board.
Pin 1 is the lower left pin – as identified by a square pad.
NOTE : Signals are active low.

J4	Diagnostics Header				
RT+	1	o	o	2	RT-
GND	3	o	o	4	GND
GND	5	o	o	6	GND
+5V	7	o	o	8	+5V
+5V	9	o	o	10	+5V

J5	Quad RJ-45 Connector
Ethernet Port 1	1
Ethernet Port 2	2
Ethernet Port 3	3

Ethernet Port 4	4

J6	Diagnostics Connector
o 1	RT+
o 2	GND
o 3	RT-

FUSES:
There are three fuses for this board,

F1: 1.5 Amp PTC, +5VDC input fuse for "DIAG HEADER" header at J4
- DO NOT PLACE

F2: 1.5 Amp PTC, +5VDC input fuse for Daughterboard header at J2

F3: 1.5 Amp PTC, +5VDC output fuse for LED header at J12
- DO NOT PLACE

SWITCHES:
There are no switches on this board.

TRIMPOTS:
There no trimpots on this board.

JUMPER POSTS:

JP1, 2, 3, 4: Switch (U4) configuration select – **DO NOT CHANGE**

JP1: 1 o o 2 PS1

JP2: 1 o o 2 PS0

JP3: 1 o==o 2 SCONF0

JP4: 1 o o 2 SCONF1

1.6 MM2/Mini4 10/100 Ethernet Daughterboard Specifications:

Number of Ports: 4
Data rates supported: 10 or 100Mbps
Connector: Quad RJ-45

1.7 MM2/Mini4 10/100 Ethernet Daughterboard Power Requirements:

The 10/100 Ethernet daughterboard uses approximately 330mA @ 5VDC.

1.8 MM2/Mini4 10/100 Ethernet Daughterboard Dimensions:

PC/104 format - 95.8 mm wide x 90.17 mm long x 13 mm thick
(3.775 in x 3.550 in x 0.50 in)